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Cognitive Behaviour Therapy for anxious paediatric dental patients: A systematic review

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Author contributions

H.S.G., A.C.B., L.R.C., M.T.H. and T.N. conceived the ideas; H.S.G. and K.A.V. collected and analysed the data and drafted the manuscript; H.S.G., K.A.V., L.R.C., M.T.H. and T.N. interpreted the data. All authors revised and approved the final version of the manuscript, and agree to be accountable for all aspects of the manuscript.

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Cognitive Behaviour Therapy for anxious paediatric dental patients: A systematic review

Summary

Background. There is a paucity of evidence about cognitive behaviour therapy in the management of dentally anxious children.

Aim. To systematically review evidence of the effectiveness of cognitive behaviour therapy for children with dental anxiety or dental phobia.

Design. Clinical trial registries, grey literature and electronic databases, including The Cochrane Library, Embase, PubMed, Scopus, Web of Science, LILACS/BBO and PsycINFO, were searched (April 2018). The reference lists of relevant studies were hand-searched. Randomised controlled trials that evaluated the effects of cognitive behaviour therapy on dental anxiety or on acceptance of dental treatment in dental patients up to 18 years were included. Two trained and calibrated reviewers performed the study selection and risk of bias assessment. The quality of the evidence was evaluated using the Grading of Recommendations Assessment, Development and Evaluation (GRADE).

Results. Six studies with a total of 269 patients, aged 41 months to 18 years, were included. Cognitive behaviour therapy decreased level of anxiety compared to control groups and improved cooperation/behaviour, though the quality of the evidence was low.

Conclusions. Cognitive behaviour therapy produces better anxiety reduction than diverse behavioural management techniques but the evidence was of low quality and further studies in children are needed.

Introduction

Childhood fear of dental treatment is prevalent, and a common reason for referral to specialist paediatric dental services^{1,2}. Such fear may manifest in many ways, including refusal to co-operate with treatment. It is commonly found in young children (e.g. pre-school), those who have had a previous negative experience, or who have been

unprepared, or have a family history of attending irregularly¹⁻⁵. For many of these children, sedation, general anaesthesia and/or restraint are excellent at enabling dental treatment to be performed⁶, even though such approaches are unlikely to help the child overcome their fear in the long term as they do not provide a learning opportunity.

Psychological approaches are known to rehabilitate fearful adults, to be less invasive and preferred by families⁷⁻¹⁰. Cognitive Behaviour Therapy (CBT) is already known to be beneficial in treating dental anxiety and phobia in adults^{8,9}. The CBT technique combines both behavioural (systematic desensitization and relaxation) and cognitive (cognitive restructuring) interventions¹⁰. A previous study showed that 79% of adults with dental phobia, accepted dental treatment without sedation¹¹ and there are randomised controlled trials, meta-analyses¹³, and a systematic review of CBT in adult dental patients⁸.

CBT provides a complementary approach to the provision of pharmacological interventions for children with high levels of dental anxiety and there are randomised controlled trials regarding CBT for treating dental anxiety and/or dental phobia in children^{9,12}. A recent systematic review reported that CBT is effective in reducing general anxiety in children¹⁴. However, there is no systematic review of the effect of CBT for paediatric dental patients. The aim of this systematic review was seek to determine to what extent CBT produces a reduction in dental anxiety and dental phobia in children.

Materials and Methods

This systematic review was registered in the PROSPERO database (PROSPERO 2016:CRD42016043996). To report this systematic review, the recommendations of Preferred Reporting Items for Systematic Reviews and Meta-Analysis – PRISMA¹⁵ were followed.

Eligibility criteria

The eligibility criteria were based on PICOS (population, intervention, comparator, outcomes and study design) strategy, as follows: 1) *population*: paediatric patients up to 18 years with dental anxiety or dental phobia. Dental anxiety must be

measured by means of validated psychometric scales, whereas dental phobia must be diagnosed according to psychiatric criteria; 2) *intervention*: cognitive behaviour therapy; 3) *comparison*: control conditions (placebo or no treatment), basic and advanced behaviour guidance techniques such as distraction and sedation; 4) *outcomes*: level of dental anxiety, acceptance of dental treatment and acceptance of CBT; 5) *studies*: randomised controlled trials (RCT) without restriction in regards to date of publication, publication status and language.

Search strategy and information sources

A systematic search was developed using controlled vocabulary (MeSH – Medical Subject Headings and DeCS – Health Sciences Descriptors), synonymous, related terms and free terms regarding paediatric patients, dental anxiety and cognitive behaviour therapy. The search strategy was modified according to the syntax rules of each database (Table 1). Two reviewers (KAV, HSGR) performed the searches in April 2018.

Studies were searched on electronic bibliography databases including The Cochrane Library, Embase, PubMed, Scopus, Web of Science, LILACS/BBO and PsycINFO. Reference list of relevant studies were hand-searched. Unpublished and ongoing trials were searched on trials registries, such as Clinical trials, ISRCTN registry, UK National Institute for Health and Care Excellence, and International Clinical Trials Registry Platform. Furthermore, grey literature was searched on ProQuest dissertations and Theses full text, and OpenGrey.

Study selection and data collection process

Two independent and calibrated reviewers (HSGR and KAV) performed study selection. The software program EndNote® (EndNote X7, Thomson Reuters, New York, USA) was used to remove duplicated references. The two reviewers were trained and calibrated by means of applying eligibility criteria to 10% (n=60) of titles/abstracts of the retrieved studies, and reached perfect agreement (Kappa=1.0). Next, these reviewers screened independently the remaining titles and abstracts to select potentially relevant trials. Full text of the articles considered included by at least one reviewer were read independently

to check for eligibility criteria. Discrepancies regarding inclusion/exclusion of a study were resolved by a third reviewer (LRC).

After the selection study step, a data extraction form was developed and pilot-tested. Two independent reviewers (HSGR and KAV) collected the following data in duplicate: study identification; participants' characteristics; description of intervention and comparison; dental procedure; outcome measure; results. Disagreements were solved by consensus.

Risk of bias of included studies

Two independent reviewers (HSGR and KAV) assessed in duplicate the risk of bias in each included study, according to the Cochrane Collaboration's Tool for Assessing Risk of Bias in Randomized Trials. This tool allows evaluating seven domains of risk of bias: random sequence generation (selection bias), allocation concealment (selection bias), blinding of participants and personnel (performance bias), blinding of outcome assessment (detection bias), incomplete outcome data (attrition bias), selective reporting (reporting bias) and other biases¹⁶.

The risk of bias for each domain was classified as high, low or unclear, according to the criteria described in the Cochrane Handbook for Systematic reviews of Interventions 5.1.0 (<http://handbook.cochrane.org>)¹⁷. The selected trials were assessed for the risk of bias considering all the key domains, and were categorized as low (low risk of bias in all domains), unclear (if unclear for one of the domains) or high (if high risk for one of the domains). Disagreements were resolved by consensus.

Data synthesis

Clinical and methodological heterogeneity were explored to check whether a meta-analysis could be performed. There was substantial clinical heterogeneity among studies, due to the different types of comparators described and the wide range of outcome measures. Given that, data was not similar enough to be combined in meta-analysis. Thus, a narrative synthesis is provided by means of text, tables and figures.

The quality of the evidence for all outcomes was judged according to the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach. This approach enable to judge the quality of body of evidence based on study design, risk of bias, imprecision, inconsistency, indirectness and other factors, as publication bias¹⁸.

Results

Study selection

A total of 1,078 studies were identified throughout search. After the removal of duplicates, 677 remained. Among them, 662 studies were removed after screening of titles and abstracts and the main reasons to exclusion was non-issue related (n=609) and non-RCT (n=35). Among 15 potentially eligible studies, six were included in this systematic review (Fig 1).

Characteristics of included studies

All six studies finally selected for the review were published in English, between 1980-2017: two were performed in the United States, one in Jamaica, one in Iran, one in Norway and one in Sweden. The included studies involved 269 patients with the age range from 41 months to 18 years (Table 2).

The number of sessions in which CBT was applied varied among studies from one^{9,19,20} to ten sessions²¹. In half of studies^{9,19,20}, CBT was applied in one session: in one⁹, CBT was administered for an average of 16 min prior to dental treatment, through modelling, relaxation training and positive self-talk; in the other two^{19,20}, CBT was applied through relaxation, distraction, and calming self-talk.

CBT was compared to conventional behavioural management techniques^{9,21}, N₂O/O₂^{9,21}, sedation²¹, general anaesthesia²¹, non-intervention^{19,20}, sensory information¹⁹, modelling²², information dissemination²², and waiting list^{22,23}.

The outcomes assessed were mostly self-report and behavioural observations. All trials evaluated treatment effects on anxiety/fear and on cooperation/behaviour. Anxiety

was measured using the Venham Clinical Anxiety Scale (VCAS)⁹, the Venham Picture Test (VPT)^{9,19,20}, Structured Clinical Interview for Dental Anxiety (SCI-DA)²¹, the State-Trait Anxiety Inventory for Children (STAIC)²² and physiological measures^{19,20,22}. Fear was measured using the Children's Fear Survey Schedule–Dental Subscale (CFSS-DS)^{21,23}, the Intra Oral Injection Fear Scale (IOIF-s)²³ and the Mutilation Questionnaire for children (MQ-c)²³. Cooperation was measured using the Venham Clinical Co-operation Scale (VCCS)⁹, the Modified version of Behavior Profile Rating Scale (MBPRS)²⁰, the Behavior Rating Scale (BRS) adapted from Machen and Johnson²², the Behavior Profile Rating Scale¹⁹, and the child's level of cooperation and anxiety on a seven-point scale, and the child's general response to the anaesthetic injection was recorded¹⁹. Two studies^{21,23} evaluated the behavioural avoidance to dental clinical situations by means of the behavioural avoidance test (BAT). All studies sought the children's perception of their anxiety.

Risk of bias

Based on all key domains, two studies were found to have high risk, and the others had unclear risk (Fig 2). In regards to specific domains, 'blinding of participants and personnel' was judged as unclear in three studies, low in one and high in **two. Half** of the studies were judged as low risk for the domain 'blinding of outcome assessment'. Almost all trials had low risk for the domain 'incomplete outcome data'. All studies were classified as low risk of bias in domains 'selective reporting' and 'other bias'.

Evidence synthesis

In five studies^{9,19,21-23} CBT showed significant decreased levels of anxiety/fear compared to controls, regardless of the method used to evaluate anxiety/fear^{9,19,21-23} or the evaluation time of CBT after receiving the treatment^{21,22}. Similarly, three studies^{9,19,20} reported a positive effect of CBT on cooperation/behaviour and two studies^{21,22} showed improvement on avoidance behaviour to dental clinical situations. However, for both of these outcomes, the level of evidence was low, given the data imprecision (Table 3).

Discussion

This paper reviews the current evidence of the effectiveness of CBT for children with dental anxiety or dental phobia. The systematic review of the evidence shows that CBT resulted in lower levels of anxiety and better cooperation/behaviour compared to various other behavioural management techniques, thus it may be effective in helping children to cope with dental anxiety.

Although repeated graded exposure is a core technique of CBT, in three studies CBT was performed in only one session. In fact, two previous reviews in adults had demonstrated that CBT could be delivered in fewer sessions, without affecting a successful outcome^{24,25}. Published studies differ from each other in the phases of CBT that were applied as follows: relaxation and distraction^{9,19,20}; modelling and positive self-talk⁹, calming self-talk^{19,20}; and exposure-based multicomponent treatment, exposure-based coping skills training conditioning and no exposure-based coping skills training conditioning²². Adult studies have also suggested that CBT was effective at reducing dental anxiety regardless of the format of delivery²⁴.

In almost all of the trials reviewed in this paper, patients who received CBT experienced lower anxiety and/or better behaviour than those who received other behaviour management techniques. The findings from the single study²² that did not find a difference between groups in regards to behaviour may be explained by the fact that in this trial participants underwent simulated dental treatment instead of real-life procedures. One of the six trials that was included in this systematic review showed no difference between the groups on the level of anxiety but in this study¹⁹, anxiety was measured using the VPT, a self-reported scale, whereas other studies that did report improved anxiety used other measures such as STAIC, VCAS and also physiological measures. Interestingly, in the three trials in which VPT was used^{9,19,20}, anxiety assessed by this scale did not differ between groups. This suggests that the VPT might not be as sensitive as other measures.

Although there were differences between the studies regarding the type of dental treatment performed, in general, CBT showed its efficacy in improving cooperation and reducing dental anxiety of children. Despite differences between studies on how anxiety was

evaluated, the various scales that were used are well known and validated. Studies have also demonstrated better results using CBT techniques compared to other kinds of behaviour management regardless of methodology^{8,25-27}.

Physiological measures such as heart rate²⁰ and radial pulse^{19,22} were used to evaluate the CBT technique. No difference was found among the groups when those variables were considered; this may be the result of CBT having differential effects on the cognitive and physiological aspects of anxiety. That is, patients continue to experience a physiological state of arousal but learn to label this in a more positive way. Such changes in cognition are a core component of CBT. It is recommended that physiological measures should be used in combination with psychometric measures to assess anxiety, given that multiple assessments provide a richness of data that cannot be obtained from relying upon a single method of assessment²⁸.

One study evaluated CBT compared to sedation using nitrous oxide/oxygen⁹. The results of both were similar which could be a great alternative for uncooperative children once it is indicated to interweave both techniques¹¹. It can be mentioned that despite the initially expensive cost of CBT, since the intervention may allow the patient to be treated without sedation in the future, this can lead to a reduction in long-term health costs¹¹.

For all studies the reporting of the methodology is limited, as evidenced by the Cochrane Collaboration's Tool for Assessing Risk of Bias in Randomized Trials.¹⁷ In particular the description of the manner of randomisation was limited, and there was no reporting of the methods of allocation concealment. Among all domains of risk of bias, the one that showed higher occurrence of high risk was 'blinding of participants and personnel'. These methodological biases suggest caution in the interpretation of the results.

There are some limitations of this systematic review; firstly, even though all efforts were made to find all relevant articles, publication bias cannot be ruled out and secondly, despite only randomised controlled trials being included, since these are considered to be the gold standard design for intervention studies, these trials have some limitations in their own right that might impact on our findings, such as small sample sizes. In

spite of this, we attempted to reduce potential biases and minimize errors by following strict criteria¹⁶ to perform this systematic review.

This systematic review has found that the quality of evidence for CBT for children with dental phobia or dental anxiety is **low**. As the six selected studies included children's self-report on their anxiety but restricted their data collection for a short period of time, more randomised clinical trials that include long-term follow-up and assess other outcomes such as oral-health-related quality of life and satisfaction with the dental treatment are needed.

Why this paper is important to paediatric dentists:

- This study points to the evidence in favour of the use of CBT for the reduction of anxiety and the enhancement of co-operation amongst children in the dental setting.

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Figure legends

Fig 1. PRISMA flowchart

Fig 2. Risk of bias

Table 1 - Search strategy used for some database

Database	Search Strategy
PubMed (http://www.ncbi.nlm.nih.gov/pubmed)	(Child [mh] OR Child* [tiab] OR Pediatric [tiab] OR Paediatric [tiab] OR Infant[mh] OR Infant* [tiab] OR Toddler [tiab] OR Adolescent [mh] OR Adolescen*[tiab] OR Youth*[tiab]) AND (Dental Anxiety [mh] OR Dental Anxiety [tiab] OR Dental Fear [tiab] OR Fears Dental [tiab] OR Phobia Dental [tiab] OR Anxieties Dental [tiab] OR Dental care [mh] OR Dental care [tiab] OR Dental treatment[tiab]) AND (Cognitive Therapy [mh] OR Cognitive Therapy [tiab] OR Cognition Therapies [tiab] OR Therapies Cognition [tiab] OR Cognitive Behavior Therapy [tiab] OR Therapies Cognitive Behavioral [tiab] OR Therapy Cognitive Behavioral [tiab] OR Therapy Cognitive Behaviour [tiab] OR Cognitive Behavioural Therapy [tiab] OR Therapies Cognitive Behavioural [tiab] OR Therapy Cognitive Behavioural[tiab] OR CBT [tiab] OR Cognitive Behaviour Treatments [tiab] OR Cognitive Behavioral Treatment [tiab] OR Behavior Therapy [mh] OR Therapy Conditioning [tiab] OR Therapies Conditioning [tiab] OR Therapies Behavior [tiab] OR Therapies Behaviour [tiab] OR Behaviour Treatments [tiab] OR Behavioral Therapy [tiab]) AND (randomized controlled trial [pt] OR controlled clinical trial [pt] OR randomized [tiab] OR placebo [tiab] OR drug therapy [sh] OR randomly [tiab] OR trial [tiab] OR groups [tiab] NOT (animals [mh] NOT humans [mh]))
Embase (http://ovid.com/)	#1- child OR Child*.mp. OR pediatrics OR Pediatric.mp. OR Paediatric.mp. OR infant OR Infant*.mp. OR toddler OR Toddler.mp. OR adolescent OR Adolescen*.mp. OR Youth*.mp. #2- dental anxiety OR Dental Anxiety.mp. OR Dental Fear.mp. OR Fears Dental.mp. OR Phobia Dental.mp. OR Anxieties Dental.mp. OR Dental care.mp. OR Dental treatment.mp. #3- cognitive therapy OR Cognitive Therapy.mp. OR Cognition Therapies.mp. OR Therapies Cognition.mp. OR Cognitive Behavior Therapy.mp. OR Therapies Cognitive Behavioral.mp. OR Therapy Cognitive Behavioral.mp. OR Therapy Cognitive Behaviour.mp. OR Cognitive Behavioural Therapy.mp. OR Therapies Cognitive Behavioural.mp. OR Therapy Cognitive Behavioural.mp. OR CBT.mp. OR Cognitive Behaviour Treatments.mp. OR Cognitive Behavioral Treatment.mp. OR behavior therapy OR Behavior Therapy.mp. OR Therapy Conditioning.mp. OR Therapies Conditioning.mp. OR Therapies Behavior.mp. OR Therapies Behaviour.mp. OR Behaviour Treatments.mp. OR Behavioral Therapy.mp.
Scopus (http://www.scopus.com/)	#1 (TITLE-ABS-KEY (Child*) OR TITLE-ABS-KEY (Pediatric) OR TITLE-ABS-KEY (Paediatric) OR TITLE-ABS-KEY (Infant*) OR TITLE-ABS-KEY (Toddler) OR TITLE-ABS-KEY (Adolescen*) OR TITLE-ABS-KEY (Youth*)) # 2 (TITLE-ABS-KEY ("Dental Anxiety") OR TITLE-ABS-KEY ("Dental Fear") OR TITLE-ABS-KEY ("Fears Dental") OR TITLE-ABS-KEY ("Phobia Dental") OR TITLE-ABS-KEY ("Anxieties Dental") OR TITLE-ABS-KEY ("Dental care")) #3 (TITLE-ABS-KEY ("Cognitive Therapy") OR TITLE-ABS-KEY ("Cognition Therapies") OR TITLE-ABS-KEY ("Therapies Cognition") OR TITLE-ABS-KEY ("Cognitive Behavior Therapy") OR TITLE-ABS-KEY ("Therap* Cognitive Behavioral") OR TITLE-ABS-KEY ("Therapy Cognitive Behaviour") OR TITLE-ABS-KEY ("Cognitive Behavioural Therapy") OR TITLE-ABS-KEY ("Therap* Cognitive Behavioural") OR TITLE-ABS-KEY (CBT) OR TITLE-ABS-KEY ("Cognitive Behaviour Treatments") OR TITLE-ABS-KEY ("Cognitive Behavioral Treatment") OR TITLE-ABS-KEY ("Behavior Therapy") OR TITLE-ABS-KEY ("Therap* Conditioning") OR TITLE-ABS-KEY ("Therapies Behavior") OR TITLE-ABS-KEY ("Therapies Behaviour") OR TITLE-ABS-KEY ("Behaviour Treatments") OR TITLE-ABS-KEY ("Behavioral Therapy"))

Table 2 - Description of studies

Author, year, country	Study design	Participants n (age)	Dental procedures	Groups		Outcome measures			Conclusions
				Intervention	Comparison	Instruments	Respondents	Moment	
Berge et al., 2017 ²³ , Norway	Blinded, parallel	67 (10-16 years)	Dental clinical situations, involving intraoral injection (drilling, extractions)	A: immediate treatment group receiving CBT 1 week after diagnostic interview, for 5 sessions (n=34)	B: waitlist-control group after 5 weeks on the waitlist, they were assigned for the CBT (n=33)	Intra Oral Injection Fear Scale (IOIF-s) Children's Fear Survey Schedule-Dental Subscale (CFSS-DS) Mutilation Questionnaire for children (MQ-c) Injection Phobia Scale for children (IS-c) Behavioural avoidance test (BAT)	Children	Before the treatment and at 1-y follow-up	- Group A exhibited reduction from pre- to post-treatment on all self-report scales and superior improvement on BAT
Shahnavaz et al. ²¹ , 2016, Sweden	Blinded, parallel	30 (7-18 years)	Dental clinical situations, involving injection of local anesthesia, and drilling	A: CBT in ten sessions (n=13)	B: Treatment as usual, such as basic behavior management techniques, sedation with midazolam, and general anesthesia (n=17)	Behavioral Avoidance Test (BAT) Self-Efficacy Questionnaire for Specific Phobias (SEQ-SP) Structured Clinical Interview for Dental Anxiety (SCI-DA) Children's Fear Survey Schedule-Dental Subscale (CFSS-DS)	Children Children and parents	Before the treatment, 3 months after, and at 1-y follow-up	- BAT: superior improvement in group A compared to B after the treatment and at 1-y follow-up (P<0.05). - SCI-DA: more participants in the CBT group did not meet diagnostic criteria for dental anxiety after and at 1-y follow-up (P<0.05) - CFSS-DS and SEQ-SP: reduction of fear and increased self-efficacy favoring group A at after treatment and at 1-y follow-up (P<0.05)
Kebriaee et al. ⁹ , 2015, Iran	Unblinded, parallel	45 (3-6.5 years)	Pulp therapy	A: CBT prior to dental treatment (n=15)	B: conventional behavioural management techniques (n=15) C: N ₂ O/O ₂ (n=15)	Venham clinical cooperation scale (VCCS) Venham clinical anxiety scale (VCAS) Venham Picture Test (VPT)	Observers Observers Children	Baseline and at treatment session: local anesthesia, rubber dam placement and high-speed handpiece use	- VPT: No significant difference between the two treatment sessions into treatment groups - Higher decrease in uncooperative behaviour and anxiety between the two dental visits at all stages in group A and C, in comparison to B (P<0.05)
Del Gaudio and Nevid ²² ,	Blinded, parallel	68 (9-13 years)	Simulation of radiographic exposition,	A: exposure-based multicomponent	D: videotape modeling condition	State-trait anxiety inventory for children (STAIC)	Children	Immediately after the oral examination	Anxiety: Lower state in group A compared to group F; B compared to D and E; A compared to group C,

1991, Jamaica			prophylactic treatment and oral examination	treatment B: exposure- based coping skills training condition C: nonexposure- based coping skills training condition	E: information dissemination/di scussion group control Condition F: waiting-list control condition	Pulse Behavior rating scale adapted from Machen and Johnson	Observers Observers		D and E No difference on behavioral or physiological measures
Treiber et al., 1985 ²⁰ , USA	Blinded, parallel	17 (41-66 months)	Restoration or extraction	A: coping skills prior to the dental visit (n=10)	B: reading of nursery tales (n=7)	Modified Behavior Profile Rating Scale (MBPRS) Heart rate VPT	Observers Children	Throughout the session Immediately prior to and following the dental session	Behaviour: lower mean MBPRS score in group A (mean 1.85, SD 1.61) compared to group B (3.56, 3.18) Anxiety an heart rate: no significant difference
Siegel and Peterson ¹⁹ , 1980, USA	Not mentioned, parallel	42 (42- 71 months)	Radiographs, prophylaxis and restoration	A: coping skills prior to the second visit	B: sensory information C: no treatment	Behavior Profile Rating Scale (BPRS) Child's level of cooperation and anxiety on a 7-point scale Child's general response to the anesthetic injection Radial pulse Stanford Preschool Internal-External scale (SPIES) VPT	Observers Children	During the dental session Following each dental session Soon after the session After the child was seated in the dental chair and immediately after the end of treatment One week prior to the visit Before and after each dental session	Fewer disruptive responses in groups A and B compared to C ($p \leq 0.001$) Level of cooperation and anxiety: less cooperation and more levels of anxiety in group C compared to A and B ($p \leq 0.001$) VPT: no significant difference Response to the anesthetic injection: greater distress in group C compared to A and B ($p \leq 0.001$) Pulse rates before entering the post treatment restorative session: lower in group A compared to B and C ($p \leq 0.001$) Pulse rates after the restoration session: lower in groups A and B, compared to C ($p \leq 0.001$) SPIES: no significant relationships between scores of control and experimental measures before and after treatment

Table 3 - Quality of evidence

Table 5 - Quality of evidence							
Number of studies	Study design	Risk of bias	Quality assessment			Other considerations	Quality
			Inconsistency	Indirectness	Imprecision		
Anxiety							
6	Randomised trials	Not serious	Not serious	Not serious	Very serious ¹	None	<div><div></div><div></div><div></div><div></div></div> LOW
Cooperation/behaviour							
6	Randomised trials	Not serious	Not serious	Not serious	Very serious ¹	None	<div><div></div><div></div><div></div><div></div></div> LOW

1. Few studies involving small sample size

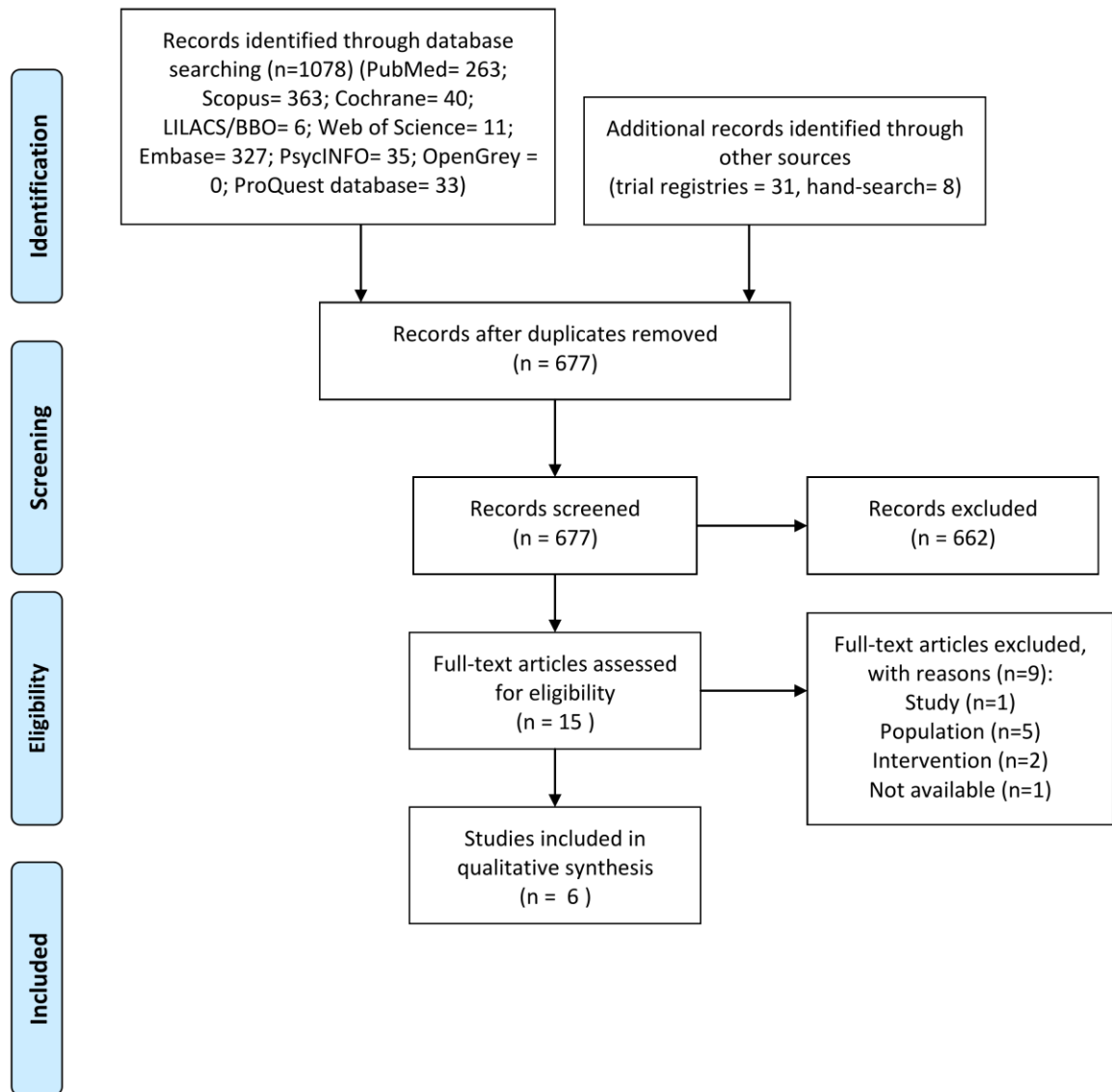


Fig 1. PRISMA flowchart

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Berge et al., 2017	+	+	+	?	+	+	+
Del Gaudio and Nevid, 1991	?	?	?	+	+	+	+
Kebriaee et al., 2015	+	+	-	?	+	+	+
Shahnavaz et al., 2016	+	?	-	+	+	+	+
Siegel and Peterson, 1980	?	?	?	?	?	+	+
Treiber et al., 1985	?	?	?	+	+	+	+

Fig 2. Risk of bias